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Management of toxic chemicals and hazardous and radioactive wastes*

Report of the Secretary-General

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* This report was prepared by the United Nations Environment Programme as task manager for chapters 19 and 20 of Agenda 21 and the International Atomic Energy Agency as task manager for chapter 22, with contributions from other United Nations agencies and international organizations. The report is a brief factual overview, which is intended to inform the Commission on Sustainable Development on key developments in the subject area.

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I. Introduction

1. The present report deals with three distinct but related chapters of Agenda 21 — namely, 19, 20 and 22, having to do with the treatment, management and disposal of hazardous or potentially hazardous materials. With regards to chemicals, Agenda 21 notes that use of chemicals is essential to meet the social and economic goals of the world community and that a great deal remains to be done to ensure the environmentally sound management of toxic chemicals. The goal of Agenda 21 with respect to hazardous wastes is to prevent and, to the extent possible, minimize, the generation of such wastes within the framework of integrated life-cycle management. The mandate with respect to radioactive wastes is to ensure that they are safely managed, transported, stored and disposed of, with a view to protecting human health and the environment. Agenda 21 recognizes the role of the International Atomic Energy Agency (IAEA) as the United Nations agency with specific statutory responsibilities for the safety of radioactive waste management.

II. Management of toxic chemicals

A. Accomplishments and constraints

2. The Inter-Organization Programme for the Sound Management of Chemicals (IOMC) was established in 1995 to serve as a mechanism for coordinating efforts of intergovernmental organizations in the assessment and management of chemicals. All IOMC participating organizations carry out activities to facilitate information-exchange concerning their activities to promote chemical safety. Recognizing that Internet access is very limited in some countries, IOMC participating organizations, with the support of donors, have begun a programme to install computers and provide training for developing countries on accessing chemical safety information through the Internet.

3. All IOMC participating organizations carry out, within their respective mandates, a range of training and technical assistance activities as a contribution to regional and national efforts to strengthen capacities and capabilities for the sound management of chemicals. In some cases — e.g., for ozone-depleting substances or for persistent organic pollutants — new and additional resources have become available through mechanisms such as the Global Environment Facility (GEF). Collaboration at the national and international levels is required to ensure that assistance activities related to international priority chemicals are implemented in such a way that "spill over" effects are ensured, which helps countries to manage the many toxic chemicals not subject to international attention.

4. The International Conference on Chemical Safety, held in Stockholm in 1994, created the Intergovernmental Forum on Chemical Safety (IFCS). IFCS identified the type of assessments made by the Organisation for Economic Cooperation and Development (OECD) and the International Programme on Chemical Safety (IPCS) which would count as international assessments in the United Nations Conference on Environment and Development. In 1994 IFCS predicted that 500 chemicals would be assessed by 2000. The number actually assessed (286) falls considerably short of the target. Reasons for the shortfall are lack of adequate resources, in Governments, IPCS and OECD, and the long time needed to streamline assessment procedures to allow increased production.

5. IPCS, spearheaded by the World Health Organization (WHO), has provided state-of-the-art guidance documents on methodologies for assessing risks from exposure to chemicals. Work has also progressed on emerging issues, particularly endocrine-disrupting chemicals, assessing risks for children, and integrated health and environmental risk assessment. Within the framework of the project on harmonization of approaches to risk assessment, work has progressed in various areas, including risk assessment terminology (jointly with OECD), cancer risk assessment, reproductive and developmental toxicity, exposure assessment and uncertainty/variability analysis.

6. In the field of risk assessment, IPCS is leading a major project on harmonization of approaches to risk assessment, with emphasis on human health. OECD continues to develop harmonized test guidelines, testing strategies, and approaches to environmental assessment. The results of this work, conducted in cooperation with other IOMC partners, will be instrumental in developing confidence in, and acceptance of, hazard and risk assessments globally. The ultimate goal is to attain convergence in the methodologies currently in use.

7. Close to 50 national institutions are involved in a project, managed by the International Labour Organization (ILO) and financed by the European Union (EU) and ILO, to make available International Chemical Safety Cards (ICSC). Currently 1,300 cards are available on the Internet, at no charge and in 11 languages (English, French, Spanish, German, Japanese, Chinese, Korean, Thai, Urdu, Finnish, Swahili). Translation of the cards in Hindi, Bengla, Tamil, and Portuguese is ongoing or planned.

8. The ILO, OECD and the Committee of Experts on the Transport of Dangerous Goods have completed the technical basis for a globally harmonized system for the classification and labelling of chemicals. In 1999, the Economic and Social Council decided to establish the Subcommittee on the globally harmonized system of classification and labelling of chemicals, thus, highlighting the importance given to this issue.

9. The elaboration over the past 10 years of such a system is a formidable illustration of the capacity of countries, intergovernmental and non-governmental organizations and even individuals, to work together when the goal is one with the potential to benefit the whole world. Universal adoption of the globally harmonized system will provide a basis for uniform identification of chemical hazards, improve hazard communication, facilitate trade in chemicals, reduce the need for animal studies, and ultimately improve overall human and environmental safety in the production, transport, use and disposal of chemicals.

10. The lack of extrabudgetary funds has resulted in reduced participation in the globally harmonized system on the part of developing countries. Worldwide adoption of the system will occur only if adequate funding is made available to countries needing to build appropriate legal and technical infrastructures, including training at the enterprise level in the use of the system. It is estimated that the annual cost to participating countries and organizations is around US$ 3 million. It is hoped that the chemical industry will play a significant role in helping establish the system as a universal voluntary standard.

11. The Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade was adopted in 1998. The Convention requires that chemicals and pesticides that have been added to the Convention because they are banned or severely restricted in at least one country in each of two regions shall not be exported unless explicitly agreed by the importing country. It also includes severely hazardous pesticide formulations that are too dangerous to be used in developing countries. The Convention will come into force 90 days after 50 countries have ratified it; until then, an interim voluntary procedure is being applied.

12. A guidance manual for establishing pollutant release and transfer registers has been developed through a multi-stakeholder approach. The manual has served as the basis in many countries for capacity-building activities for the introduction of registers. Currently 43 countries in all regions have a register or are in the process of developing one.

13. The text of a new treaty on persistent organic pollutants (POPs) was agreed in December 2000. The treaty, to be adopted and signed in Stockholm in 2001, inter alia, takes measures to protect health and the environment from 12 POPs or groups of POPs, includes provisions to include additional POPs to the treaty and prevent the introduction of new POPs into commerce, and provides for technical and financial assistance to developing countries and countries with economies in transition. The treaty will be named the Stockholm Convention on Persistent Organic Pollutants.

14. In 1993 the ILO adopted Convention No. 174, concerning the Prevention of Major Industrial Accidents, defining the relevant responsibilities, duties and rights of Governments, employers and workers. A related code of practice and a manual provide guidance on technical and safety issues.

15. New centres of poison information have been established in 25 countries. Guidelines on poison control, to provide Governments and health-care professionals with advice on setting up and strengthening poison centres, have been published. The IPCS database INTOX, on CD-ROM, provides information for poison centre professionals and clinical toxicologists. A globally harmonized system for data collection on human poisonings, toxic exposures and chemical incidents has been developed by the IPCS INTOX programme, with the involvement of experts from over 60 countries. The system is available in English, French, Portuguese and Spanish and is currently being translated into Arabic, Chinese and Russian.

16. All IOMC participating organizations took part in the preparation of national chemical management profiles in some 70 countries around the world. The profiles document and assess the existing infrastructure and capacities for the sound management of chemicals and serve in many cases as a starting point for coordination, priority-setting and technical assistance. The great majority of national profiles is available on the Internet through the UNITAR national profile home page.

17. Various United Nations agencies assist countries in awareness-raising and capacity-building for the safe management of chemicals and pesticides. Some examples include:

(a) The Integrated Pest Management programme of the Food and Agriculture Organization of the United Nations (FAO) and its support in the establishment and strengthening of pesticide regulatory frameworks;

(b) Training programmes of FAO and the United Nations Environment Programme (UNEP) to support national efforts to implement the new Rotterdam Convention (see para. 11);

(c) UNEP's comprehensive programme to assist countries in reducing and/or eliminating the release of persistent organic pollutants into the environment;

(d) Training courses on environmental and health-risk assessment and the management of toxic chemicals, conducted in a number of developing countries by WHO, through IPCS and its partner institutions;

(e) The services of the United Nations Industrial Development Organization (UNIDO) to reduce the use of toxic chemicals and the release of chemical wastes in selected subsectors, particularly in agrochemicals (pesticides), building materials (brick and cement), leather, petrochemicals, pharmaceuticals and biotech products, pulp and paper, and textile industries;

(f) The training and capacity-building programmes of the United Nations Institute for Training and Research (UNITAR) which support national efforts to develop coordinated and integrated national programmes for the sound management of chemicals, being implemented in partnerships with one or several IOMC participating organizations.

B. Issues for further consideration

18. There is a strong need for countries that have not already done so to ratify or otherwise accede to the chemicals-related conventions, including ILO Conventions No. 170 and No. 174, the Rotterdam Convention and the future Stockholm Convention on POPs.

19. A significant challenge will be to maintain the same degree of political and financial commitment to processes such as the Rotterdam Convention and the future Stockholm Convention on POPs once they enter the stage of implementation.

20. If progress is to be realized and international commitments made over the past eight years are to be met, an increase in priority and resources is essential.

21. Further work includes:

(a) The establishment of integrated and ecologically sound pest management strategies, including strategies for vector control;

(b) The identification, neutralization and safe disposal of obsolete stocks of pesticides and other chemicals, including polychlorinated biphenyls (PCBs);

(c) The adoption and entry into force of the convention on persistent organic pollutants;

(d) The implementation of systems for the prevention of major industrial accidents and for emergency preparedness and response;

(e) Measures to reduce the danger of severely hazardous pesticide formulations;

(f) Efforts to revise the FAO International Code of Conduct on the Distribution and Use of Pesticides;

(g) The expanded establishment of national poison control centres;

(h) The expanded establishment of pollutant release and transfer registers at the national level.

III. Management of hazardous wastes

A. Accomplishments and constraints

22. Cleaner production strategies, leading to the minimization of waste generation, have been

increasingly recognized by many Governments, industries and other institutions as effective ways to reconcile environmental protection with economic development. Countries have moved towards developing an enabling policy regime and establishing the necessary institutional framework to meet the needs of the user organizations. The establishment of national cleaner production centres (NCPC) is one example of this progress.

23. Within the United Nations system, an increasing number of agencies have emphasized the preventive approach in their work programmes, agendas and activities. The UNIDO/UNEP NCPC Programme and the ILO/UNEP Programme on Cleaner Production in Employers' Organizations are two examples. United Nations entities such as WHO, ILO, the United Nations Educational, Scientific and Cultural Organization and the World Bank are integrating the preventive approach in their publications, conferences and technical assistance activities.

24. Decision makers in all stakeholder groups (Governments, businesses, financial institutions, non-governmental organizations etc.) have increasingly easy access to quality and user-friendly information on cleaner technologies, technologies that treat hazardous wastes, operating practices, and policies required to achieve environmentally sound management of hazardous wastes.

25. The ECE countries have introduced the "5-R" policy and strategy, which promotes the principles embodied in cleaner production: reduction at source, replacement, recycling, recovery and reutilization.

26. The following points highlight some of the constraints and obstac es that need to be overcome:

(a) National legislation and regulations, where they exist, are often not well complied with or are not enforced, due to lack of capacity and resources. The process of preparing and enacting the appropriate legal framework has been slow;

(b) Many countries lack adequate institutional capacity in hazardous waste management, in monitoring and controlling imports of hazardous chemicals and hazardous wastes, and in preventing illegal traffic;

(c) Many Governments lack policy tools for developing with industry approaches to hazardous waste management. Many government officials and small and medium-sized enterprises do not have the necessary environmental awareness, expertise, and financial resources to deal with this issue;

(d) Industry, in many cases, views hazardous waste management as a burden and compliance as an obligation to be met only to the extent that the regulatory system requires it;

(e) Data and statistics on hazardous waste generation and transboundary movements, which are vital for making policies and strategies and also for monitoring progress are only beginning to be collected.

(f) Very slow progress has been made by international organizations in providing assistance to States in assessing the health and environmental risks resulting from exposure to hazardous wastes. Very few parties to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal have compiled statistics on the health or environmental effects of hazardous wastes;

(g) Governmental fiscal incentives are still not targeted at implementing environmentally sound policies, including cleaner production. Cost-intensive measures are often unimplemented owing to lack of financial resources.

B. Issues for further consideration

27. There is urgent need to strengthen national capacities for the effective management of hazardous wastes by supplementing resources for putting relevant policies and programmes into effect.

28. The private sector, particularly small and medium-sized enterprises, needs to be involved, sensitized and made aware of the seriousness of this issue and be included as a willing partner in launching programmes and activities.

29. Greater effort at the international level is required for environmental assessment of technologies and for making the information available to the decision makers who decide on a technology.

30. Hazardous waste management needs to be integrated and mainstreamed into routine business decision-making processes.

31. Attention now needs to be focused on consumption side of products — their useful life and

the disposal/discard phase — and not just on the manufacturing side.

32. Governments need to formulate policies so that fiscal incentives are made available to the users and developers of clean technologies. Innovative financing mechanisms, like revolving funds, need to be set up to facilitate implementation of cost-intensive cleaner production measures.

33. Awareness-raising programmes need to be intensified.

34. Governments need to provide a regulatory and non-regulatory framework, including economic instruments, that would ensure protection of health and the environment from hazardous wastes, so that industry can comply with the requirements of the Basel Convention while continuing to perform in the competitive economic and trade domains.

35. Life-cycle management and coherent energy policies need to be put into place to avoid displacement of problems to the waste sector.

36. New civil liability schemes need to be developed to generate a real insurance market worldwide, covering the transboundary movements of hazardous wastes and their management.

37. Efforts must continue to obtain additional ratifications of the Basel Convention and related protocols/agreements, particularly the Ban Amendment, to allow it to become legally binding.

38. The capabilities of developing countries to deal with hazardous wastes issues should be strengthened, by strengthening national hazardous waste management units in charge of developing and implementing the corresponding policies and strategies and by developing legislation and regulations and ensuring their enforcement.

39. The dissemination of up-to-date information on cleaner technologies, including environmental assessment of technologies, hazardous waste minimization and treatment technologies and information on policy interventions should continue.

40. Financial institutions and development banks, should be encouraged to develop innovative financing schemes to promote investments in cleaner production and hazardous waste minimization.

41. Environmental accounting and economic tools should be further developed, in order to understand the real cost of improper hazardous waste management and to orient industry and consumers towards cleaner processes and products.

IV. Management of radioactive wastes

A. Main accomplishments and constraints

42. In chapter 22 of Agenda 21 (para. 22.4), it is recommended that Member States, in cooperation with international organizations, promote policies to minimize and limit the generation of radioactive waste, and provide for its safe processing, conditioning, transportation and disposal.

43. Good progress has been made in this direction in many of the countries using nuclear power. The United States and France, the countries with the largest civilian nuclear electric power programmes, have reduced operational wastes from their nuclear power plants by factors of 4-5, when measured by volume, and by a factor of 10, when measured by radioactivity, over the past decade. This has been achieved by a combination of improved procedures and technology, and by the recycling and reuse of recovered materials within the plants. IAEA has provided a forum for information exchange and technology transfer on such technologies among Member States.

44. The scientific consensus reached at recent international technical meetings is that mature, sustainable and safe technologies exist for all areas of radioactive waste management, except the disposal of high-level and long-lived wastes.

45. During the past decade, new disposal sites for low- and intermediate-level radioactive waste have been established in the Czech Republic, Finland, France, Japan, Norway, Slovakia and Spain. There has been a trend away from disposal in shallow earthen trenches to disposal in near-surface concrete vaults or in mined underground caverns constructed tens of metres below the earth's surface. In 1999, the world's first geologic repository for the disposal of long-lived trans-uranic waste was opened at the Waste Isolation Pilot Plant (WIPP), in Carlsbad, New Mexico, United States.

46. Disused, sealed radioactive sources are a potential source of public radiation exposure if they are lost from regulatory control, and accidents involving sealed radiation sources, mostly in the medical sector, have led to serious radiation injuries and fatalities. Recently, international attention was directed at this problem by the initiation in 1999 of an action plan for the safety of radiation sources and the security of radioactive materials. The plan includes strategies for bringing the sources under control and for their safe management and disposal when they are no longer in use. IAEA has been assisting developing countries to render disused sealed sources safe by appropriate conditioning and storage techniques. Between 1996 and 2000, expert teams trained and qualified by IAEA visited 24 developing countries, where disused spent sources, mostly radium-226, were safely secured.

47. In chapter 22, Member States are also encouraged to support IAEA efforts to develop and promulgate radioactive waste safety standards as an internationally accepted basis for the safe and environmentally sound management and disposal of radioactive waste. IAEA standards covering all important areas of radioactive waste management are being developed. They address: national administrative arrangements for safe radioactive waste management, safety in the processing of waste for disposal, decommissioning of nuclear facilities, control of radioactive discharges, restoration of areas with radioactive contamination, and safe disposal of radioactive waste in near-surface and geological repositories. To date, 12 standards documents have been issued, the most important being the safety fundamentals document entitled *The Principles of Radioactive Waste Management*, which establishes the safety basis for radioactive waste management. It is planned that the corpus of radioactive waste safety standards will be completed within the next five years.

48. An event not envisaged in chapter 22 was the concluding of a legally binding instrument on the safety of radioactive waste management. In September 1997, the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management was adopted by a Diplomatic Conference convened by IAEA at its headquarters in Vienna. At present only two more of the required 25 States must ratify the Convention before it comes into force. The Convention incorporates important elements of the Code of Practice on the International Transboundary Movement of Radioactive Waste, which was developed in 1990. Improvement in the safety of radioactive waste management will be prompted by regular peer reviews of national reports.

49. In relation to paragraph 22.5 (a) of chapter 22, IAEA has been closely cooperating with relevant international organizations to ensure coordination of both format and schedule concerning the adoption of the latest version of the Agency's Regulations for the Safe Transport of Radioactive Material.

50. In paragraph 22.5 (b) of chapter 22, Member States are encouraged to bring about a final ban on the disposal of low-level radioactive waste at sea. Under the auspices of the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (London Convention, 1972), the sea dumping of all types of radioactive waste was finally prohibited in 1994. The prohibition replaced the earlier voluntary moratorium, which had been adopted in 1983 by the contracting parties to the London Convention. In a related development, discharges of radioactive material to the marine environment from land-based sources are coming under increasingly stringent controls, especially in the North-East Atlantic where the 1998 Sintra (Portugal) ministerial statement of the contracting parties to the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Convention) commits contracting parties to progressive and substantial reductions of discharges, emissions and losses of radioactive substances, with the ultimate aim of concentrations in the environment near background values for naturally occurring radioactive substances and close to zero for artificial radioactive substances.

51. Since the end of the "cold war", it has been recognized that there are areas of the earth affected by radioactive residues from nuclear weapons development and testing. Programmes are under way, especially in the United States, to remediate the affected areas and restore them to a state in which they can be reoccupied. IAEA has, at the request of Member States, organized assessments by international expert teams of the radiological situation at several of these sites, including the Bikini, Mururoa and Fangataufa atolls in the Pacific Ocean and Semey (formerly Semipalatinsk) in Kazakhstan.

52. Although progress is being made in many areas of radioactive waste management, progress towards developing repositories for high-level and long-lived radioactive waste has been slow. The preferred solution for the disposal of such waste is emplacement in deep underground (geological) repositories. Mainly as a result of public opposition to the location of such repositories, only one geological repository is so far in operation (the WIPP repository for United States Defence Department wastes). It is becoming increasingly recognized that progress towards resolving this problem can only be achieved through greater consultation among the proponents (usually the Government and its agencies) and the concerned public, and eventually through the involvement of the concerned persons (the "stakeholders") in the decision-making process.

53. One technical issue which confronts developing countries is the lack of a regulatory and technological infrastructure to manage radioactive waste safely, especially disused sealed sources. IAEA has a variety of programmes to help build capacity to manage radioactive waste in these countries, but the need exceeds the resources available.

B. Issues for further consideration

54. As nuclear facilities age, decommissioning in ways that assure safety for both workers and the public becomes important. Decommissioning gives rise to substantial amounts of radioactive waste which must be properly managed and disposed of. Due to the current unavailability of geologic repositories for high-level waste and unwanted spent fuel, several countries have placed them in centralized interim storage facilities. Finally, in the planning for geologic repositories, increased consideration is being given to approaches to disposal that are reversible and allow wastes to be retrieved.